Nicotinamide loaded Chitosan nanoparticles: A study on their topical use for acne treatment

Hend Abd-Allah [1], Rasha T.A. Abdel-Aziz [2], Maha Nasr [1]

[1]Department of Pharmaceutics andIndustrial Pharmacy, Faculty of Pharmacy, Ain Shams University,Egypt

[2] Department of Dermatology ,STD's and Andrology, Faculty of Medicine, Minia University, AlMinya,Egypt

Background: Topical delivery has always presented a challenge for formulators, because of the barrier properties of the stratum corneum. In order to achieve therapeutic action through skin delivery, the topical route can be used for delivery of either pure drugs, or cosmeceuticals. Among the chronic dermatological diseases is acne vulgaris, which is a disease of the pilosebaceous gland causing skin lesions which are either inflammatory or noninflammatory. Among the promising cosmeceuticals/ nutraceuticals recently used for acne treatment is nicotinamide, since it exhibits anti-inflammatory properties and is reported to decrease sebum production. Therefore in this work, we hypothesized that loading nicotinamide in chitosan nanoparticles would better allow the penetration of this hydrophilic nutraceutical via the bioadhesive nature and tight junction opening property of the latter.

Methods: In the current work, chitosan nanoparticles loading the nutraceutical nicotinamide were optimized, characterized, and clinically tested on patients suffering from acne vulgaris.

Results: The topical merits of chitosan nanoparticles were proven, in which they exhibited strong skin adhesion ex vivo and high nicotinamide deposition in the different skin layers (stratum corneum, epidermis and dermis) a total of 68%. When clinically tested on patients, nicotinamide nanoparticles displayed 73% reduction in the inflammatory acne lesions compared to untreated areas

Conclusions: proved that chitosan nanoparticles can be a clinically sounding option for treatment of skin diseases.